

Appendix 1

Estimating the Effect of Aid on Growth

THE APPENDIXES PROVIDE TECHNICAL DETAILS OF SOME of the important original research results featured in this report. They are based on research papers that are available as journal articles or working papers that can be downloaded from the Assessing Aid website (<http://www.worldbank.org/research/aid>). The reader who wants more detail should go to these underlying sources. In most cases the datasets will also be available over the web. This first appendix deals with the effect of aid on growth.

The theoretical foundation for recent empirical studies of growth relies on dynamic models of inter-temporal optimization. In these models the accumulation of physical and human capital depends on initial conditions and the institutions and policies that affect the return to savings and investment. Thus, growth is a function of initial conditions, institutions and policies, and external shocks such as changes in the terms of trade or in weather patterns.

To introduce aid, this kind of analysis must take account of the fact that poor growth may induce donors to provide more aid. Instrumental variables techniques essentially split aid flows into permanent and transitory components. Only permanent aid goes into the growth regression. The regressions in table A1.1 use the dataset developed in Burnside and Dollar (1997). The dependent variable is growth rate of per capita GNP, averaged over four-year periods, beginning with 1970–73 and ending with 1990–93. There are six four-year periods and 56 developing countries in the sample (table A1.2), though there are some missing observations where data were not available.

Regression 1 explains growth as a function of initial conditions, the incentive regime, and an error term that captures external shocks. Following other literature, the measures of the incentive regime included are the inflation rate (Fischer 1993), the budget surplus (Easterly and Rebelo 1993), a measure of trade openness (Sachs and Warner 1995), and a measure of institutional quality (Knack and Keefer 1995). The level of government consumption is also considered, but this does not have a robust relationship with growth.

The index of economic management used in this chapter is formed as a weighted sum of the inflation rate, the budget surplus, trade openness, and institutional quality, where the weights are the regression coefficients in regression 1. This index can be interpreted as the predicted growth rate, given the quality of the incentive regime and assuming that the country had the average value of the initial condition variables. The index has a mean of 1.1 with a standard deviation of 1.6. (The phrase “good management” in the text refers to a level of 2.7 or above.)

In regression 2 the index replaces the individual components; it can be seen to have a very strong association with growth. Regression 3 introduces aid relative to GDP and instruments for it with population and variables reflecting donor strategic interests. As in Boone (1994), there is no relationship between aid and growth. The picture changes, however, if aid is interacted with the management index. Regression 4 includes aid interacted with the index, as well as aid squared interacted with the index. (Potential endogeneity requires that instruments be used for aid as well as for both interactive terms.) The positive coefficient on aid times management and the negative coefficient on aid squared times management indicate that aid has a positive effect on growth in a good policy environment but that there are diminishing marginal returns to aid. It should be stressed, however, that the estimate of the diminishing returns is imprecise. To measure this requires cases in which there is good policy and large amounts of aid. There are only a few such cases, so the estimate depends on these few outliers. If they are dropped from the dataset, there is no longer a significant coefficient on the aid squared times management term. However, the positive coefficient on aid times management is quite robust (regression 5).

The sample includes some middle-income countries, such as Chile and Mexico, that have received little aid and have access to international

capital markets. Regressions 6–8 repeat regressions 3–5, but drop the middle-income countries. The results are stronger in two senses: first, the estimated impact of aid on growth in a good management environment is larger; and second, the statistical confidence has increased.

For a given quality of policy and level of aid, regressions 4, 5, 7, and 8 each provide a different point estimate of the marginal impact of 1 percent of GDP in aid on growth. The average point estimates for different qualities of policy are:

Marginal effect on growth of 1 percent of GDP in aid (percentage points)		
Poor policy (index = 0)	Mediocre policy (1.1)	Good policy (2.7)
–0.3	0	0.5

While the estimated impact of aid in a poor policy environment is negative, the estimate is not statistically different from zero. The estimated impact in a good policy environment is significantly positive. These averages from the four regressions are the estimates shown in Figure 1.5. The positive coefficient on the interactive term also means that policy improvements are more potent if a country is receiving aid. Finally, note that government consumption has no significant relationship with growth—important because aid often finances government consumption (chapter 3).

Table A1.1 Estimating the Effect of Aid on Growth

Dependent variable: growth rate of per capita GNP (four-year average)

Sample: 56 developing countries, four-year periods (1970–73 to 1990–93)

	<i>Regression</i>							
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
Initial GDP per capita	–0.60 (1.04)	–0.63 (1.30)	–0.76 (1.00)	–0.74 (0.90)	–0.95 (1.09)	–0.80 (0.82)	–1.14 (1.22)	–1.42 (1.27)
Financial depth	0.01 (0.95)	0.01 (1.12)	0.02 (1.68)	0.03 (1.66)	0.02 (1.62)	0.03 ^a (1.99)	0.05 ^a (1.99)	0.03 ^a (1.99)
Political instability	–0.42 (1.50)	–0.42 (1.57)	–0.39 (1.43)	–0.34 (1.15)	–0.34 (1.19)	–0.72 (1.15)	–0.93 (1.75)	–0.69 (1.32)
Economic management	—	1.00 ^b (7.17)	1.03 ^b (7.01)	0.50 ^a (1.93)	0.70 ^b (3.42)	1.20 ^b (7.00)	0.01 (0.01)	0.58 ^a (2.08)
Trade openness	2.11 ^b (4.11)	—	—	—	—	—	—	—
Inflation	–1.56 ^b (3.92)	—	—	—	—	—	—	—
Budget surplus	4.07 (1.03)	—	—	—	—	—	—	—
Institutional quality	0.66 ^b (3.75)	—	—	—	—	—	—	—
Government consumption	–2.53 (0.55)	–1.96 (0.52)	–4.38 (0.68)	–1.53 (0.21)	–1.73 (0.25)	–2.38 (0.40)	2.10 (0.29)	1.13 (0.17)
Aid/GDP	—	—	–0.08 (0.28)	–0.15 (0.35)	–0.37 (0.89)	–0.10 (0.49)	–0.28 (0.79)	–0.53 (1.69)
Management x aid/GDP	—	—	—	0.66 ^a (2.11)	0.24 ^a (2.38)	—	0.99 ^b (2.69)	0.36 ^b (3.64)
Management x (aid/GDP) ²	—	—	—	–0.07 (1.63)	—	—	–0.09 ^a (2.10)	—
<i>R</i> ²	0.41	0.41	0.39	0.35	0.39	0.46	0.36	0.46
Number of observations	284	284	272	272	268	189	189	185

a. Significant at the 5 percent level.
b. Significant at the 1 percent level.

Table A1.2 Countries in the Dataset

<i>Sub-Saharan Africa</i>	<i>Latin America</i>	<i>Middle East and North Africa</i>	<i>East Asia</i>	<i>South Asia</i>
Botswana	Argentina	Algeria	Indonesia	India
Cameroon	Bolivia	Egypt	Korea	Pakistan
Côte d'Ivoire	Brazil	Morocco	Philippines	Sri Lanka
Ethiopia	Chile	Tunisia	Thailand	
Gabon	Colombia	Syria	Malaysia	
Gambia	Costa Rica	Turkey		
Ghana	Dominican Republic			
Kenya	Ecuador			
Madagascar	El Salvador			
Malawi	Guatemala			
Mali	Guyana			
Niger	Haiti			
Nigeria	Honduras			
Senegal	Jamaica			
Sierra Leone	Mexico			
Somalia	Nicaragua			
Tanzania	Paraguay			
Togo	Peru			
Zaire	Trinidad and Tobago			
Zambia	Uruguay			
Zimbabwe	Venezuela			

Appendix 2

Explaining the Success or Failure of Structural Adjustment Programs

RECENTLY, THE THEORY OF MACROECONOMIC POLICY and economic reforms has changed focus. Instead of viewing the making and implementation of economic policy as a control problem in which the issue is to find the optimal policy rule, the core of the analysis has shifted to the actual policy process. The chosen economic policy is explained by appealing to binding incentive constraints facing optimizing policymakers. The theoretical literature in political economy has identified several factors affecting the likelihood of successful reforms (see Rodrik 1996 for a recent review of the literature). To test these theories, and to investigate if factors under the World Bank's control have any effect on success or failure of reform, a measure of the extent of policy reform is needed.

Previous work on explaining reform progress has used different outcome measures (or changes in them) as proxies of reform, but that has obvious shortcomings. For example, outcome is partly driven by exogenous shocks which are difficult to disentangle from policy effects, there is lag between policy change and outcome, and reforms differ in objectives and may therefore not be captured by a single outcome measure. Dollar and Svensson (1998) avoid these problem by using a zero-one variable reflecting failure or success of reform programs supported by the World Bank (outcome). The binary evaluation variable (outcome) is determined *ex post* by the Operations Evaluation Department (OED) of the World Bank.

Using the zero-one reform measure as dependent variable, a probit regression could be specified relating the probability of successful reform

to domestic political economy variables, World Bank effort variables and other controls. The regressions in table A2.1 use the dataset developed in Dollar and Svensson (1998), consisting of 182 completed adjustment loans during the period 1980–95, for which comparable data could be collected: 36 percent of these reform programs were judged not to have met their objectives.

Regression 1 explains the probability of success of reform as a function of only the core political economy variables. All variables enter significantly: success is associated with democratic government and with political stability. Ethnic fractionalization and length of time that the incumbent has been in power enter non-linearly: the basic message is that high degrees of fractionalization are bad for policy reform, and that long-term incumbents are not likely candidates for reform. Regression 1 predicts correctly 75 percent of the observations.

In regression 2, several Bank-related variables are added to the specification, recognizing that there is an endogeneity issue that has not yet been addressed. Some of these variables are likely to be exogenous: whether the adjustment loan focuses on trade reform or sectoral reform depends on the nature of the policy problems in the country and the government's desire to attack particular problems. What is clearly under the Bank's influence is the amount of preparation staffweeks and amount of supervision staffweeks. In regression 2, preparation is positively associated with the probability of success and supervision, negatively associated. Once controlling for these two variables, other Bank-related variables such as number of conditions, loan size and the allocation of conditions among tranches play no role.

An implicit assumption underlying regression 2 is that the World Bank does not respond to exogenous shocks that reduce the probability of success—that is, the error term in regression 2 is assumed to be uncorrelated with the amount of preparation and supervision. However, an exogenous shock that reduces the probability of success is likely to call forth more preparation and supervision resources. Thus, in order to estimate these relationships it is necessary to partition the World Bank effort into a predicted part that is independent of exogenous shocks—and an unpredicted part. This is possible to do by employing a two-stage probit technique developed by Amemiya (1978). Regression 3 reports the result of including the predicted part of the World Bank effort variables. Once these Bank-effort variables are treated as endogenous, there is no relationship between any of them and the success or failure of adjustment

programs, while the relationship between the political-economy variables and outcomes is stable. This finding is consistent with the view that there are institutional and political factors that affect the probability of success of a reform program. Given those factors, none of the variables under the World Bank's control significantly affects success or failure of adjustment programs. If endogeneity is ignored, there is a positive relationship between preparation and outcomes, and a negative relationship between supervision and outcomes. That these relationships disappear in the two-stage regressions indicates that the associations reflect how the World Bank allocates resources.

To further explore the last issue, regression equations for supervision and preparation are specified in columns 4-6. Regression 4 shows that preparation is strongly related to a number of variables (regional dummies, loan size, number of conditions, income, and population) that in turn have no relationship with the probability of success—but has very little relationship with the political economy variables.

There is a broadly similar story for the allocation of supervision resources (regressions 5 and 6). Unlike the preparation equation, regional dummies are no longer important. The regional departments of the World Bank have different amounts to prepare loans, but once these loans are approved the regions devote similar resources to supervising a loan of given characteristics. In the supervision equation, it is also considered that preparation may affect supervision. In the OLS regression (regression 5) there is a large, positive relationship between preparation and supervision. This reflects the fact that the error terms in the preparation and supervision equations are certainly correlated. Anything unobserved that leads to higher (lower) than predicted preparation will almost certainly lead to higher (lower) than predicted supervision. The fact that the regional dummies seem to belong in the preparation equation but not in the supervision equation means that it is possible to use them as instruments to correct for this simultaneity problem. In the two-stage least squares regression (regression 6), the relationship between preparation and supervision is no longer significant.

Table A2.1 Estimating the Outcome of Adjustment Loans

	<i>Regression</i>					
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
Dependent variable	Outcome	Outcome	Outcome	Preparation	Supervision	Supervision
Regression method	Probit	Probit	Probit/IV ^a	OLS	OLS	IV ^a
Observations	220	182	179	179	179	179
Countries	67	60	60	60	60	60
Constant	−0.098 (0.32)	−0.762 (0.72)	−0.366 (0.25)	3.311 (4.38)	2.685 (4.02)	3.272 (3.11)
Ethnic fractionalization	5.930 (4.16)	8.176 (4.40)	7.763 (4.04)	0.018 (0.04)	−0.134 (0.42)	−0.144 (0.46)
Ethnic fractionalization ²	−6.513 (4.27)	−8.501 (4.32)	−8.046 (3.79)	0.043 (0.10)	0.213 (0.59)	0.254 (0.73)
Government crisis	−1.301 (3.94)	−2.372 (4.46)	−2.285 (4.29)	−0.223 (2.48)	−0.029 (0.39)	−0.017 (0.18)
Democratically elected	0.585 (2.61)	0.887 (3.11)	0.912 (3.09)	0.124 (1.98)	−6.1E-3 (0.01)	−0.009 (0.18)
Time in power	−0.089 (2.07)	−0.118 (2.23)	−0.113 (2.09)	0.004 (0.36)	0.003 (0.29)	0.004 (0.48)
Time in power ²	0.003 (2.15)	0.004 (2.17)	0.004 (2.02)	−3.7E-3 (0.99)	3.6E-3 (1.14)	−4.7E-3 (1.47)
Preparation staff weeks (log)		0.966 (2.31)	0.323 (0.24)		0.339 (5.14)	0.364 (1.34)
Supervision staff weeks (log)		−1.410 (2.92)	−0.869 (0.67)			
Finance conditions (percent)		1.217 (1.84)	1.423 (2.02)	−0.149 (1.07)	−0.078 (0.67)	−0.120 (0.99)
Macro and fiscal conditions (percent)		0.910 (1.04)	0.766 (0.89)	−0.260 (1.33)	−0.323 (1.97)	−0.256 (1.41)
Sectoral conditions (percent)		1.386 (2.26)	1.161 (1.83)	0.002 (0.02)	0.180 (1.65)	0.175 (1.59)
Trade conditions (percent)		1.067 (1.70)	0.961 (1.46)	−0.021 (0.15)	−0.141 (1.25)	−0.141 (1.23)
Number of conditions (percent)				0.153 (3.29)	0.074 (1.85)	0.077 (1.28)
Loan size (log)				0.281 (5.29)	0.210 (4.37)	0.220 (2.50)
Structural adjustment loan				−0.145 (2.16)	−0.062 (1.10)	−0.105 (1.58)
Sub-Saharan Africa				−0.080 (0.78)	0.093 (1.09)	
Latin America & Caribbean				−0.284 (3.06)	0.020 (0.25)	
East Asia				−0.148 (1.39)	−0.118 (1.33)	
Initial GDP per capita (log)				−0.064 (1.04)	−0.153 (2.96)	−0.184 (3.39)
Initial population (log)				−0.147 (3.90)	−0.099 (3.00)	−0.124 (2.66)
<i>Predicted ability</i>	<i>0.75</i>	<i>0.80</i>				
<i>Adjusted R²</i>				<i>0.34</i>	<i>0.45</i>	

a. Regression 3 is estimated by a two-stage procedure described in Dollar and Svensson (1998), with preparation and supervision specifications given in regressions 4 and 6. Regression 6 is estimated by 2SLS with preparation specification given in regression 4. t-statistics in parentheses.

Appendix 3

Analysis of the Fungibility of Foreign Aid

ONE OF THE MAIN CHANNELS THROUGH WHICH foreign aid influences development outcomes is its impact on the recipient country's public expenditures. The link between foreign aid and public expenditures is, however, not straightforward because some aid may be "fungible." An aid recipient country could render ear-marked aid fungible by reducing its own resources in the sector that receives aid and transferring them to other sectors of the budget.

Feyzioglu, Swaroop, and Zhu 1998 study this issue using annual data from 1971 to 1990 from 14 countries—Bangladesh, Costa Rica, Ecuador, Egypt, Honduras, Kenya, Mexico, Malawi, Malaysia, Peru, Sierra Leone, Thailand, Turkey, and Zaire. Two foreign aid variables were used: total aid to a country (the annual net disbursement of Official Development Assistance or ODA), and the sectoral composition of concessionary loans from all sources, over time and across countries. Other variables in the data base included total as well as sectoral classification of public spending, per capital real GDP, infant mortality, average years of schooling, school enrollment ratios, military expenditures of neighboring countries, and the share of agriculture in national income.

The model in the study develops links between foreign aid and public spending assuming that the observed mix of public expenditures results from a combination of the government's utility maximizing choice using fungible resources—domestic and external—and the purchase of goods from the nonfungible portion of aid. In the empirical analysis the impact of aggregate foreign aid on total government spending is first estimated to examine whether foreign aid affects the resource

mobilization effort of the recipient country. The impact of earmarked sector-specific aid on components of government spending is estimated next and the fungibility hypothesis examined.

While the problem of simultaneity exists in principle in this study, attempt is made to minimize it by (a) using aid disbursement numbers which in most part are predetermined; and (b) including a few economic, political and social indicators of the recipient country as explanatory variables in the regression analysis.

Tables A3.1 and A3.2 report the main regression results of the study. Regression 1 shows a positive and statistically significant relationship between the share of total government expenditure in GDP and the share of the net disbursement of ODA. The regression shows that a dollar increase in foreign aid leads to an increase of 0.95 cents in total government spending. There is no tax relief effect in this sample. Increases in the net disbursement of concessional loans, however, are far more stimulative of total government expenditures. Regression 2 shows that a dollar increase in concessionary loans leads to a \$1.24 increase in government expenditures. The likely reason why concessionary loans have a relatively larger impact on government expenditures than overall ODA is that a portion of such loans have matching requirements—that is, for every dollar that a government spends on a specified activity it gets a matching amount in concessionary loans. Among the control variables, the share of agricultural output in GDP—a measure of level of development in a country—is the only variable that is statistically significant in both the equations. The negative coefficient suggests that countries that have a bigger share of their GDP from agriculture and are therefore relatively less developed, have relatively smaller government spending. Regression 3—which includes expenditure shares according to the economic classification—indicates that roughly three-quarters of ODA is spent on government's current expenditure. The coefficient of ODA in regression 5 shows that the remaining one-quarter of aid (after accounting for current expenditure) goes for capital expenditure.

Regressions reported in table A3.2 examine the link between the net disbursement of concessionary loans to a particular sector and public spending in that sector. In each of the six regressions—one each for education, health, energy, agriculture, transport and communication, and defense—the coefficient on the variable *Government expenditure net of aid in GDP*, which is statistically significant in all regressions, indicates how the government distributes an additional dollar that it gets from all

resources net of concessionary loans. Regression 5 has a positive and statistically significant relationship between loans to the transport and communication sector and the public spending in that sector; the coefficient on the aid variable is 0.92, which is statistically not different from 1. Other estimates indicate that loans to agriculture and energy, for the sample countries, have been fungible. But for the education and health sectors no null hypotheses of interest can be rejected. The likely explanation is that based on the available data for these sectors, the power of the test is not enough to reject any reasonable hypothesis. In recent years, the donor community has been increasingly concerned that development assistance is being used to fund military expenditures. Data from the sample countries do not, however, support the hypothesis that foreign aid is diverted for military purposes (regression 6). The results show that there is no consistent link between aid to a sector and increased spending in that sector—that is, aid tends to be fungible.

Table A3.1 Impact of Foreign Aid on Total, Current, and Capital Public Expenditures, 1971–90

<i>Dependent variable^a</i>	<i>Regression</i>					
	<i>Total government spending</i>		<i>Public current expenditures</i>		<i>Public capital expenditures</i>	
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
Constant						1.80 (0.29)
Government expenditure net of aid in GDP			0.63 (15.33)	0.65 (14.44)	0.35 (9.15)	0.35 (8.80)
Share of ODA in GDP	0.95 (5.82)		0.72 (10.59)		0.29 (4.65)	
Share of concessionary loans in GDP		1.24 (4.08)		1.22 (8.97)		0.27 (1.19)
Real per-capita GDP	0.01 (1.67)	0.01 (1.10)	−0.002 (0.43)	−0.004 (1.05)	0.002 (0.59)	0.002 (0.80)
Neighbor's military expenditure in GDP [lag(−1)]	0.33 (1.04)	0.43 (1.26)	−0.10 (0.76)	−0.53 (0.37)	0.08 (0.64)	0.04 (0.30)
Average schooling in labor force [lag(−1)]	−1.78 (1.04)	−1.12 (0.61)	3.74 (4.19)	2.92 (2.90)	−3.58 (4.27)	−1.95 (2.66)
Infant mortality rate [lag(−1)]	0.09 (1.51)	0.06 (0.94)	0.06 (2.19)	0.01 (0.26)	−0.05 (1.91)	−0.02 (0.89)
Share of agriculture output in GDP [lag(−1)]	−0.63 (2.69)	−0.53 (2.09)	−0.12 (0.94)	−0.09 (0.63)	0.07 (0.59)	0.15 (1.55)
Gastil index of political and civil liberties	0.39 (0.64)	0.32 (0.50)	−0.17 (0.50)	−0.48 (1.35)	0.04 (0.12)	−0.03 (0.10)
<i>Adjusted R²</i>	<i>0.87</i>	<i>0.84</i>	<i>0.97</i>	<i>0.97</i>	<i>0.79</i>	<i>0.19</i>
<i>Observations</i>	<i>128</i>	<i>128</i>	<i>89</i>	<i>89</i>	<i>89</i>	<i>89</i>
<i>Model^b</i>	<i>Fixed</i>	<i>Fixed</i>	<i>Fixed</i>	<i>Fixed</i>	<i>Fixed</i>	<i>Random</i>

a. Dependent variables are expressed as a share of gross domestic product (GDP).

b. Model indicates whether the country dummies in the regression represent a fixed effects or a random effects model.

Note: For regressions that represent a fixed-effects model, coefficients of country dummies are not reported. t-statistics in parentheses.

Table A3.2 Impact of Sectoral Concessionary Loans on Sectoral Government Expenditure, 1971–90

<i>Dependent variable^a</i>	<i>Regression</i>					
	<i>Education 1</i>	<i>Health 2</i>	<i>Energy 3</i>	<i>Agriculture 4</i>	<i>Transport and communication 5</i>	<i>Defense 6</i>
Constant	4.12 (1.49)	1.19 (1.28)	−0.63 (0.51)	−2.07 (1.20)	2.08 (3.44)	3.36 (0.89)
Government expenditure Net of aid in GDP	0.08 (4.94)	0.02 (4.32)	0.01 (1.99)	0.03 (2.75)	0.10 (5.57)	0.11 (5.10)
<i>Sectoral loans (as a share of GDP)</i>						
Education	1.55 (1.08)	0.01 (0.03)	0.16 (0.27)	0.05 (0.05)	0.52 (0.31)	0.71 (0.38)
Health	−3.21 (0.73)	−0.31 (0.23)	3.07 (1.61)	3.45 (1.29)	1.10 (0.21)	5.19 (0.91)
Energy	−0.71 (1.21)	0.12 (1.84)	0.36 (3.82)	0.21 (1.59)	0.17 (3.75)	0.02 (0.07)
Agriculture	0.56 (2.22)	0.19 (2.45)	0.09 (0.82)	−0.05 (0.32)	−0.01 (0.03)	0.21 (0.65)
Transport and communication	−0.59 (3.01)	0.14 (2.44)	0.16 (1.92)	0.21 (1.77)	0.92 (3.98)	0.36 (1.44)
Other sectors	−0.05 (1.65)	0.02 (2.30)	0.01 (0.79)	0.06 (3.25)	0.04 (1.09)	−0.01 (0.35)
Real per capita GDP	0.0003 (0.26)	−0.0001 (0.15)	0.001 (1.44)	0.0003 (0.45)	−0.0002 (0.17)	0.0002 (0.15)
Neighbor's military expenditure in GDP [lag (−1)]	−0.12 (1.28)	0.003 (0.17)	0.02 (0.41)	−0.004 (0.12)	−0.04 (0.67)	0.01 (0.16)
Average schooling in labor force [lag (−1)]	−0.19 (0.68)	−0.08 (0.89)	−0.12 (0.99)	0.46 (2.55)	−1.65 (4.87)	−0.29 (0.75)
Infant mortality rate [lag (−1)]	0.01 (1.37)	−0.003 (0.91)	0.002 (0.53)	0.01 (1.60)	−0.03 (2.38)	−0.01 (1.12)
Share of agriculture output in GDP [lag (−1)]	−0.05 (1.17)	0.008 (0.65)	0.02 (1.12)	−0.004 (0.18)	−0.08 (1.92)	−0.03 (0.56)
Gastil index of political and civil liberties	−0.17 (1.56)	−0.06 (1.92)	−0.06 (1.23)	−0.02 (0.32)	−0.07 (0.57)	−0.03 (0.2)
<i>Adjusted R²</i>	<i>0.04</i>	<i>0.24</i>	<i>0.18</i>	<i>0.09</i>	<i>0.89</i>	<i>0.34</i>
<i>Observations</i>	<i>128</i>	<i>128</i>	<i>128</i>	<i>128</i>	<i>128</i>	<i>128</i>
<i>Model^b</i>	<i>Random</i>	<i>Random</i>	<i>Random</i>	<i>Random</i>	<i>Random</i>	<i>Random</i>

See Table 1.

a. Dependent variables are expressed as a share of gross domestic product (GDP).

b. Model indicates whether the country dummies in the regression represent a fixed effects or a random effects model.

Note: For regressions that represent a fixed-effects model, coefficients of country dummies are not reported. t-statistics in parentheses.

Appendix 4

The Impact of Civil Liberties and Democracy on Government Performance

TO MEASURE “CIVIL LIBERTIES” THE STUDY UNDERTAKEN as part of the research on aid effectiveness used a variety of existing indicators constructed by political scientists (Isham, Kaufmann, and Pritchett 1997). The two most general indicators were the Freedom House (1997) civil liberties index which ranks countries annually on a seven-point scale based on assessments of 14 factors, such as a press free of censorship, freedom of assembly and demonstration, freedom of religion, and free trade unions. A different index compiled by Humana (1996) ranks countries on a scale from 0 to 100 on the degree to which the country complies with the human rights agreed to in the 1966 UN Covenant on Civil and Political Rights.

To measure “democracy,” there are similar rankings constructed by political scientists that focus more narrowly on the extent to which a country’s leaders (executive and legislative) were chosen by elections. This includes a political index of democracy created by Freedom House (1997) as well as others.

To measure the performance of governments we used a sample of the economic rates of return (ERR) of World Bank projects, which requires some explanation. Since the World Bank applies the same project selection and implementation procedures across all countries, the *differences* across countries in returns are an indication of how effective the government is in implementing public projects.

To assess the impact of the governance variables we began from a base specification of the determinants of ERR from Isham and Kaufmann (forthcoming), which included a set of policy variables (black

market premia, fiscal surplus), economic variables (terms of trade changes, GDP growth, the capital to labor ratio), a dummy for “project complexity” and a set of dummy variables for the sector of the project. For the time-varying variables, we used the average value in the three years prior to the year in which the project was evaluated (usually the same as the completion year). We experimented with and without a set of regional dummy variables. Table A4.1 shows the base case results, estimated using a Tobit procedure to allow for the downward truncation of the dependent variable (the ERR is truncated as -5).

To this equation are added the variables for civil liberties. Both civil liberties variables had a strong positive and statistically significant impact on the performance of Bank-financed government projects (table A4.2). The two variables produce qualitatively similar results and the range of the estimates suggests that improving from the worst to the best civil liberties would improve the rate of return on government investment projects by between 8 percentage points (Freedom House index) and 22 (Humana index) (the average return in the sample was 16).

Two other interesting results from this regression suggest that this impact reflected the impact of citizen voice on the performance of government. First, indicators of civil strife (riots, political strikes and demonstrations) are *positively* related to the ERR on Bank projects, but that partial correlation is explained by the fact that there is more of this expression of discontent in countries with *more* civil liberties. Once one accounts for the greater civil liberties, this eliminates any independent impact of civil strife, indicating that when civil liberties allow it there is greater expression of all types of citizen voice and that ultimately this voice is a force for improving government performance.

Second, once the regressions explaining project returns included civil liberties there was no additional impact of electoral democracy. So, while electoral democracy and civil liberties are obviously closely linked, both in practice and in the data, the main channel of influence appears to be the availability of civil liberties rather than the more purely political mechanisms of choosing leaders.

Table A4.1 Base Specification for the Nongovernance Determinants of the Economic Rate of Return of Government Projects, 1974–87

	<i>Estimate without regional dummies</i>	<i>Estimate with regional dummies</i>
<i>Exogenous variable</i>		
In (capital/labor)	–1.09 (0.067) ^a	–1.66 (0.060) ^a
Dummy for project complexity	–4.29 (0.017) ^b	–4.23 (0.016) ^b
Terms of trade shock	0.0015 (0.889)	0.001 (0.922)
<i>Policy variable</i>		
Black market premia	–0.046 (0.000) ^b	–0.037 (0.000) ^b
Fiscal surplus	0.197 (0.149)	0.266 (0.063) ^a
GDP growth	0.193 (0.357)	0.013 (0.949)
<i>Regional dummy variable</i>		
East Asia		–3.33 (0.154)
Latin American and the Caribbean		–4.74 (0.072) ^a
Europe, the Middle East, and North Africa		–4.93 (0.100) ^a
Sub-Saharan Africa		–10.8 (0.000) ^b
<i>Sectoral dummy variable</i>		
Agriculture	0.027 (0.992)	1.39 (0.602)
Energy and public utilities	–3.92 (0.136)	–3.18 (0.220)
Transport and tourism	3.85 (0.137)	6.24 (0.016) ^b
Urban	10.1 (0.011) ^b	11.9 (0.003) ^b

a. p-level less than 0.10.

b. p-level less than 0.05.

Note: We report p-levels of the test whether the coefficient is 0 rather than test statistics themselves. The p-level is the significance level at which the null hypothesis can be rejected, hence a p-level less than 0.05 indicates a rejection of the null hypothesis at (at least) the 5 percent level. The p-levels are in parentheses. The sample size is 761.

Table A4.2 Impact of Civil Liberties Indicators on the Economic Rate of Return of Government Projects, Controlling for Economic and Project Variables

<i>Index</i>	<i>Without regional variables</i>	<i>With regional variables</i>
Freedom House	1.95	1.32
civil liberties, 1978–87	(0.000) ^a	(0.047) ^a
Humana, 1982–85	0.251	0.256
	(0.009) ^a	(0.025) ^a
a. p-level less than 0.05.		
<i>Note:</i> Sample sizes are 649 for the Freedom House civil liberties index and 236 for the Humana index.		

Appendix 5

Estimating the Impact of Analytical Work

WHILE THERE HAVE BEEN VARIOUS ANALYSES OF the impact of aid in the aggregate, far less attention has been devoted to investigating the impact of different types of aid and the composition of the aid portfolio. Of particular importance in this context is the relationship between financial transfers and analytical work. This distinction, and the effort to measure the impact and economic return to analytical services, is of particular relevance in a context where, with increasing access of developing countries to nonconcessional sources of finance, it is often argued that the comparative advantage of international institutions such as the World Bank will shift toward the provision of such “non-lending” services.

In the case of the World Bank, such analytical work comprises two distinct areas. Countrywide studies include Economic Memoranda containing a comprehensive account of economic performance and prospects, as well as topical reports such as Poverty Assessments, Public Expenditure Reviews, and so on that underpin the World Bank’s policy advice. These are complemented by sectoral studies such as reviews of the Transport Sector, Health and Education Sector Reports—which provide the broad framework that generally serves as a basis for subsequent lending operations in these sectors. Undertaking this range and magnitude of work does not come cheap—annual expenditures on economic analysis and advice are more than \$100 million.

Issues, Approach, and Data

The three key questions addressed in Deininger, Squire, and Basu (1998) are (1) whether economic and sector work (ESW) enhances project quality, thereby making a positive contribution to development impact; (2) whether reallocation of staff time from activities related to supervision or preparation of specific projects to ESW or vice versa could have enhanced overall project quality; and (3) whether other goals, such as a tradeoff between lending volume and lending quality, might have guided the allocation of scarce staff resources. Estimation of reduced form equations for project quality (as well as demand for resources in preparation and supervision of projects, respectively) that can be derived from the manager's assumed objective function provides a basis for empirical testing of these hypotheses. Information on project performance is based on ratings of the Bank's Operations Evaluation Department (OED) of either the rate of return as estimated after project completion (for the set of projects where such an estimation is actually feasible) or a zero-one rating that classifies a project as either satisfactory or unsatisfactory. These measures are available for 1,367 and 3,957 projects, respectively, although availability of data on ESW inputs somewhat reduces the sample.

Results

This approach finds that ESW has a significant positive impact on various measures of quality of World Bank projects. As table A5.1 indicates, a one-staffweek increase in the amount of time devoted to ESW before project initiation is associated with an increase in the economic rate of return for an individual project of between 0.02 and 0.04 percentage points, translating into an increase of between \$12,000 and \$25,000 in the project's net present value for an all-inclusive cost (with overheads, travel, and so on) of no more than \$3,000—a dollar of ESW yields four to eight dollars in development impact. To the extent that a staffweek of ESW benefits more than one project, this would be an underestimate. Indeed, examining the impact of ESW on a country's entire lending program indicates that a dollar of ESW yields between 12 and 15 dollars of development impact. And even this figure fails to cap-

ture nonproject related benefits of ESW—as in influencing broader policy formulation and analysis in specific countries.

A question that arises from the analysis is whether the allocation of resources between different types of support has been appropriate. Assuming that staff resources are fungible across time and between different uses, one would expect the marginal contribution of ESW to the quality of lending to be lower than that of lending services (preparation and supervision), because—in contrast to lending services—ESW can have benefits beyond its immediate impact on lending. Indeed, ESW is often undertaken to provide the basis for policy advice to governments and is not necessarily tightly linked to a particular project or lending program. Deininger, Squire, and Basu find the reverse, however—ESW has a systematically positive effect on the quality of the lending program, whereas neither preparation nor supervision turn out to be significant. This suggests that reallocation of staff time from lending services to ESW would have increased the quality of the lending program. Consistent with this, we find that task managers at the project level are able to reduce the time allocated to lending services by about 2.5 staffweeks for every staffweek expended on ESW. We infer that ESW helps staff to identify and support new investment options (it expands the set of feasible projects) and design better projects *ex ante* (it improves the quality of projects already in the investment program). Preparation

Table A5.1 Impact of Economic and Sector Work on Project Outcome and Economic Rate of Return

<i>Dependent Variable</i>	<i>Project Outcome</i>	<i>Rate of Return</i>
ESW	0.090 ^b (0.407)	4.229 ^c (1.664)
Public sector surplus	0.719 (0.963)	14.974 (53.654)
Inflation	−0.037 ^a (.021)	1.917 (10.248)
Openness	0.739 ^c (0.018)	−3.495 (21.888)
<i>No of projects</i>	873	302
<i>R²/LL</i>	−534.62	0.142

a. Significant at the 10 percent level.

b. Significant at the 5 percent level.

c. Significant at the 1 percent level.

Note: Coefficients and standard error multiplied by 100. Sector dummies included but not reported. Standard errors in parentheses.

and supervision, by contrast, can improve the quality of a project (whether good or bad) only *ex post*.

Even though the preceding results suggest that higher levels of ESW will improve the quality of the lending program, it is still possible that, within a given resource envelope, shifting staff time from lending services to ESW will reduce the overall lending volume. Addressing this question, we find that this was indeed the case—lending services were between 40 and 50 percent more effective in increasing total commitments than ESW. But if disbursements—resource transfer—is the variable of interest, we find that managers could have increased both lending quality and disbursements by switching resources from lending services to ESW. This, together with the conclusion that there has been underinvestment in ESW from the standpoint of project quality, suggests that the volume of commitments has (at least to some degree) been an additional objective guiding the disposition of staff resources. These results provide some insight into this tradeoff between quality and quantity—the analysis suggests that on average a manager was indifferent between a decrease of \$2 million in the net present value of a lending program and an additional \$4 million of lending volume. If this estimate is broadly accurate, it suggests that managers were prepared to allow a substantial reduction in program quality in return for only a small increase (2 percent) in commitments relative to the average program size.